



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/730,584

12/08/2003

Sheng Teng Hsu

SLA 0803

2129

7590

07/23/2004

David C. Ripma
Patent Counsel
Sharp Laboratories of America, Inc.
5750 NW Pacific Rim Boulevard
Camas, WA 98607

EXAMINER

WILSON, SCOTT R

ART UNIT

PAPER NUMBER

2826

DATE MAILED: 07/23/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s) ⁶	
	10/730,584	HSU ET AL.	
	Examiner	Art Unit	
	Scott R. Wilson	2826	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 December 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 December 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>12/8/03</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION***Specification***

The disclosure is objected to because of the following informalities: The Brief Description of the Drawings lists Figures 1, 3 and 4, but the figures are labeled 1, 2 and 3. Appropriate correction is required.

Drawings

The informal drawings filed in this application are acceptable for examination purposes. When the application is allowed, applicant will be required to submit new formal drawings.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pan et al. in view of Summerfelt. As to claim 1, Pan et al., Figure 2, discloses an RRAM memory cell formed on a silicon substrate having an operative junction therein and a metal plug (12) formed thereon comprising a CMR layer (20)(col. 3, line 3). Pan et al. does not disclose expressly the CMR layer formed between first and second refractory metal layers and first and second oxidation resistant layers. Summerfelt, Figure 16, discloses a high dielectric constant capacitor comprising a first oxidation resistant layer (50)(col. 10, line 2), a first refractory metal layer (36)(col. 10, line 5), the dielectric (38), a second refractory metal layer (40)(col. 10, line 25) and a second oxidation resistant layer (46)(col. 8, line 61). At the time of invention, it would have been obvious to a person of ordinary skill in the art to form the CMR layer of Pan et al. with the electrode structure of Summerfelt. The motivation for doing so would have been to provide an adhesion layer to bond with silicon and oxygen blocking layer to prevent oxidation (Summerfelt, col. 2,

Art Unit: 2826

lines 55-59). Therefore, it would have been obvious to combine Summerfelt with Pan et al. to obtain the invention as specified in claim 1.

As to claim 2, Summerfelt discloses (col. 10, line 2) and (col. 8, line 61) that the oxidation resistant layers are formed from TiN.

As to claim 3, Summerfelt discloses (col. 7, line 37) that layer (37), an amorphous nitride barrier layer is formed to have a thickness of 100 nm. Figure 16 illustrates that this is within the scope of layers (50) and (46) being less than 300 nm.

As to claim 4, Summerfelt discloses (col. 10, line 5) and (col. 10, line 25) that the refractory metal layers are formed from Pt.

As to claim 5, Summerfelt discloses (col. 7, line 37) that layer (37), an amorphous nitride barrier layer is formed to have a thickness of 100 nm. Figure 16 illustrates that this is within the scope of layers (36) and (40) being less than about 50 nm.

As to claim 6, Pan et al. discloses (col. 1, line 21) that the CMR layer is formed from a CMR material, specifically, $\text{Pr}_{0.7}\text{CaO}_{0.3}\text{MnO}_3$ (PCMO).

As to claim 7, Pan et al., Figure 4, discloses that a metal indicator layer (26) is formed to be 5 – 10 nm thick. The scale of Figures 2 and 4 illustrate that the thickness of CMR layer (20) is within the scope of being about 50 nm.

As to claims 8-14, the device of Pan et al. in view of Summerfelt would necessarily have to be formed in order to function, so that the method comprising the means of forming the device is inherent in the device structure itself.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Scott R. Wilson whose telephone number is 571-272-1925. The examiner can normally be reached on M-F 8:30 - 4:30 Eastern.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan Flynn can be reached on 571-272-1915. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2826

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

srw
July 22, 2004



NATHAN J. FLYNN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800